REMARKS

Introduction

Claims 1-6, 8, 9, 11 and 13 are pending in the application, claims 7, 10 and 12 being previously canceled, and claim 14 being cancelled herein. Claims 1, 5 and 6 are amended herein. Of the claims, only claims 1 and 5 are in independent form.

Claim Rejections - 35 USC 112

Claim 14 was rejected under 35 U.S.C. 112, second paragraph, as being dependent from a cancelled claim. Claim 14 is cancelled herein rendering the rejection moot.

Claim Rejections - 35 USC 103

Claims 1-6, 8, 9, 11, 13 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over combinations of Simmons (U.S. Patent No. 5,565,049), Hobson et al. (U.S. Patent No. 5,744,241), Nguyen et al. (U.S. Patent No. 5,244,730), Kieser et al. (U.S. Patent No. 4,767,641), Kleeberg et al. (U.S. Patent No. 4,729,906), Gleason (U.S. Patent No. 5,888,591), Yanagihara et al. (U.S. Patent No. 4,693,799), Yoshikawa et al. (U.S. Patent No. 5,529,631) and 4th State, Inc. (www.4thstate.com/PS%201010.htm). Reconsideration and withdrawal of these rejections are requested in view of the amended claims and for the following reasons.

Independent claim 1

Independent claim 1 is amended herein to require a modulus of elasticity of 200 to 900 N/mm^2:

> A conveyor belt, when bent to a certain curvature over deflector rolls during operation, is notably elongated on the convex side of the bending. If the required force to achieve such curvature and elongation should remain acceptably low, i.e. the belt should appear

acceptably flexible, then the conveyor belt base or at least its upper layer must have a rather low modulus of elasticity. Therefore the feature of the rather low elasticity modulus of 200 to 900 N/mm^2 for the belt base or its uppermost layer has now been specified in claim 1. This low modulus of elasticity requirement in conveyor belts is in contrast to thin substrates such as tapes, foils or ribbons, where almost no elongation on the convex side occurs upon bending and which can thus have a rather high modulus of elasticity and yet be acceptably flexible. *See* the specification on page 1, line 19 to page 2, line 16 and page 5, lines 14-28.

Once the belt base or its uppermost layer are required to have such low modulus of elasticity, then any coating outer layer applied onto that belt or upper layer must mandatorily have a similarly low modulus of elasticity, otherwise the coating would rupture or peel off under the operating conditions of the conveyor belt, requiring thousands or even millions of repetitive such bendings over deflector rolls: The coating outer layer is on the convex side of the bent belt and is thus also notably elongated. Plasma polymers, however, have a high degree of crosslinking (*See* page 4, lines 28-34 of the specification), which results in a very high modulus of elasticity, so they have been considered so far by the person skilled in the art as unsuited as coating outer layer on conveyor belts. This belief might have been to the extent to be an actual prejudice against plasma coatings on conveyor belts.

Accordingly, there is no cited prior art that applies an <u>outer layer</u> onto a <u>conveyor belt base</u> by <u>plasma-coating</u>, as is the object of the instant invention as recited in independent claim 1. The closest cited references disclose as follows:

- Simmons applied an ordinary, pre-formed (i.e. not plasma-polymerized) PTFE sheet onto a conveyor belt.

- Kieser et al. "plasma-treated" "substrates" and in figure 6 a "belt-like substrate", but shown is a ribbon, not a conveyor belt. Furthermore in his figure description he stated that the embodiment of figure 6 is a variation of the embodiment of figure 4; since the

latter embodiment has openings 19 for "discharging the unconsumed reaction products of the gases supplied", the plasma treatments of figures 4 and 6 are to be understood as "plasma-etching processes" or as "processes for activating substrate surfaces", not as "processes for producing polymer layers on substrates by plasma polymerization" (cf. column 1, lines 17-21 of Kieser et al.). The latter would consume the gases supplied without the need for discharging openings.

- Gleason coats a range of substrates, such as wires, micro-ribbon cables, twisted wires, neural probes, tubing or silicon substrates, but not conveyor belts.

- Yanagihara et al. applied a plasma-polymerized coating on magnetic recording tapes , which are examples of above very thin substrates, but not conveyor belts (see above).

- Yoshikawa et al. surface-treated or coated "sheet materials", which are not conveyor belts, e.g. he made "hydrophilic" an only 100 micrometers thick polyester sheet or he "fluorinated" a rubber sheet; neither these two surface modifications is a coating produced by plasma polymerization.

The Examiner cited Hobson et al. in his rejection of claim 1, for allegedly disclosing that PTFE coatings are known in the art to be deposited by plasma process (column 3, lines 40-45), on Kieser et al., allegedly disclosing that plasma can be used to deposit films on various substrates, on Nguyen et al., allegedly disclosing suited plasma conditions for PTFE film formation, and on Kleeberg et al., allegedly disclosing monomers such as C_2F_4 or C_4F_8 and microwave plasma of 2.45 GHz.

These publications could not, however, in Applicant's view, overcome the above outlined skilled person's prejudice against applying a plasma polymer coating outer layer onto a conveyor belt. The passage in Hobson et al. cited by the Examiner actually reads: "Another proposed approach has been plasma/monomer treatment <u>of</u> PTFE, as is described in Japanese Laid-Open

Patent Application 5-147163". This is a post-treatment of already existing PTFE with monomers and plasma, not a formation of PTFE itself using monomers and plasma, which is in line with the disclosure of the Japanese publication referred to by Hobson et al.

Applicant's proposed and claimed solution to lower the crosslinking in plasma polymers, and thus to make them useful as coating outer layers for conveyor belts, is the introduction of oxygen to an extent to have 10-30 atom% oxygen as measurable at its surface by XPS. This results in a partial oxidative degradation of the plasma polymer, cleaving to some extent the tertiary crosslinking sites of the polymer chain, thus lowering the coating's degree of crosslinking and modulus of elasticity. The introduction of oxygen into the plasma polymer layer is thus not a simple side effect resulting from the manner in which the process is carried out, or as was hinted at Examiner.

The Examiner held that Gleason discloses supplying "oxygen gas" to the process chamber so as to provide a PTFE substrate surface with an oxygen content to provide certain benefits including better chemical properties of the film. Applicant believes that the Examiner's interpretation of Gleason is incorrect and based on hindsight. Column 23, lines 35-47 of Gleason, as cited by the Examiner, contain the expression "oxygen and/or silicon-bearing gases", actually meaning "oxygen-bearing gases, silicon-bearing gases, or oxygen-bearing and silicon-bearing gases". The term "oxygen-bearing gas" is not understood in the art to refer to oxygen itself. Gleason's term "oxygen-bearing gas" refers to oxygen-containing gases mentioned in the exemplary feed gases on column 10, lines 53-65. For her preferred oxygen-containing feed gas, hexafluoropropylene oxide, Gleason herself states that the amount of incorporated oxygen was, even when used in pure form, a trace amount, or none, or less than about 2 atomic % (column 11, lines 38-42; column 10, line 67 to column 11, line 3; column 14, lines 43-45). This is clearly below the 10-30 atom% required by instant claim 1 and indicates that Gleason seeks to *prevent* incorporation of oxygen into the coating.

The Examiner also cited Gleason in combination with the Simmons and Hobson et al. references against the claims, holding that Gleason would disclose known plasma processes for depositing the PTFE onto any number of substrates to reap the benefit of increased film flexibility and properties. Applicant notes that Gleason is indeed concerned with the problem of unacceptably high crosslinking and lack of flexibility of plasma coatings. She teaches, however, to use a pulsed PECVD or a thermal CVD to solve the problem. These solutions are totally different from the instant invention, teaching oxygen addition in order to break down the crosslinking sites.

The Examiner held that Yanagihara et al. teaches gases including O_2 may simultaneously be added to the plasma polymerization process to provide the benefit of oxygen addition. Applicant believes that Yanagihara et al. does not teach any "benefit" of adding any of the gases indicated in the cited passage of column 7, lines 21-25. Yanagihara et al. only teach that these gases should be added "as required". Applicant believes that the skilled person would not have an incentive to adopt Yanagihara et al.'s teaching to a plasma-polymerized coating whatsoever, even less to one intended for a conveyor belt, as it would prima facie add up to the process complexity and cost without apparent "benefit".

Nguyen et al. , which the Examiner cited as disclosing process parameters for plasma polymerization, even teaches against incorporation of oxygen into the coating (e.g. claims 4 and 6).

In view of the foregoing even if Gleason and Yanagihara et al. were taken collectively, even collectively with the other cited references, as done by the Examiner, there would still not be an incentive for a person skilled in the art to apply oxygen to a plasma coating, even less to one intended for a conveyor belt.

The Examiner held that the exact amount of oxygen is a result effective variable, that too little oxygen will provide no added benefit and too much will hinder the deposition process, and that it would have been obvious to determine the appropriate level of oxygen, citing *in re Boesch*. Applicant believes that when the cited prior art does not disclose any "benefit" of adding oxygen to plasma polymerisates (Yanagihara et al.), does not teach to add oxygen to a plasma polymerization at all (Simmons, Kleeberg et al., Hobson et al.), or teaches against using marked amounts of oxygen in plasma polymer coatings (Gleason, Nguyen, et al.) then the feature of marked amounts of oxygen is inventive over this prior art. As soon as this invention is made, then the determination of the exact amount of oxygen in order to obtain the required coating properties may indeed be easily determined by routine experiments.

In view of the foregoing, it is respectfully submitted that independent claim 1 is patentably distinguishable over the cited art. As claims 2-4 and 11 depend from claim 1, and accordingly have all the features of claim 1, it is submitted that these claims are patentable over the cited prior art. It is respectfully requested that the rejection of the claims under 35 U.S.C. 103(a) be withdrawn.

<u>Independent claim 5</u>

Independent claim 5, as amended herein, contains features similar to those recited in amended to claim 1. Therefore it is submitted that claim 5 is not obvious over the cited prior art for at least the same reasons noted above for claim 1. As claims 6 (amended herein to depend from claim 5), 8, 9 and 13 depend from claim 5, and accordingly have all the features of claim 5 it is submitted that these claims are patentable over the cited prior art.

Conclusion

It is respectfully submitted that a full and complete response to the Office Action has been made. The claims are believed to be in condition for allowance. Early and favorable action

is respectfully requested. If the Examiner has any further questions or concerns, the Examiner is invited to contact the Applicant's undersigned attorney/agent.

Applicants herewith request a one (1) month extension for filing of this *Amendment & Response*. This request also accompanies a *Request for Continued Examination*. The fees for the extension of time and RCE should be charged to Deposit Account No. 08-2442 of the undersigned. If any additional fee is due, the Director is authorized to charge Deposit Account No. 08-2442.

Respectfully submitted,
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